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# Q factor

Word:

Word

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**Q factor** is a measure of the "quality" of a resonant system. Resonant systems respond to frequencies close to the natural frequency much more strongly than they respond to other frequencies. On a graph of response versus frequency, the bandwidth is defined as the 3 dB change in level besides the center frequency. The definition of the bandwidth BW as the "full width at half maximum" or FWHM is wrong.

The Q factor is defined as the resonant frequency (center frequency)  $f_0$  divided by the bandwidth BW:

$$Q = \frac{f_0}{f_2 - f_1} = \frac{f_0}{BW}$$

Bandwidth BW =  $f_2 - f_1$ , where  $f_2$  is the upper and  $f_1$  the lower cutoff frequency.

In a tuned radio frequency receiver (TRF) the Q factor is:

$$Q = \frac{1}{R} \sqrt{\frac{L}{C}}$$

In optics, the optical Q factor of a resonant cavity is the ratio of energy stored to energy dissipated in the cavity. If the Q factor of a laser's cavity is abruptly changed, the laser can be induced to emit a pulse of light; this technique is known as Q-switching.

## Other uses

*In marketing and pop culture commentary, Q factor is sometimes used as a casual synonym for Q Score.*

## External link

Conversion: Quality factor Q to 'bandwidth per octaves' and 'bandwidth per octaves' N to quality factor Q

### Some articles mentioning "Q factor":

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<a href="#">ATX</a>	<a href="#">Factor programming</a>	<a href="#">Form factor</a>	<a href="#">Hyperfinite type II-1</a>	<a href="#">Scale factor</a>
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<a href="#">Cryoprecipitate</a>	<a href="#">Factor V Leiden</a>	<a href="#">Guanylate cyclase</a>	<a href="#">Hyperfinite type II-infinity</a>	<a href="#">Trial division</a>
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